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April 1978



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COVER: DT2 Mark Roberson—assigned to the Base Dental Clinic, Marine Corps Logistics Support Base, Barstow, Calif.—puts finishing touches on a set of dentures. This month the Navy's dental technicians are celebrating the 30th anniversary of their rating. For a sample of their "on duty" world, see page 7. (Photo by J.J. Amari)

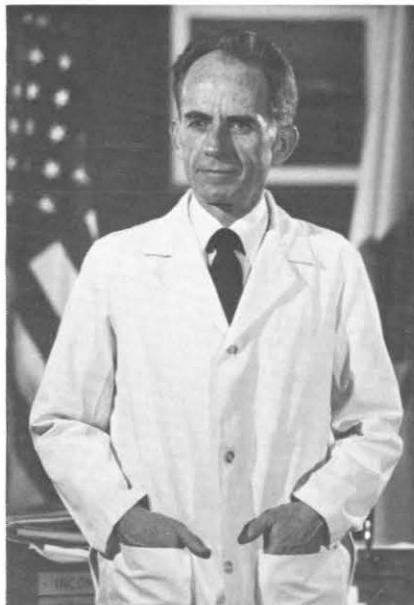
From the Surgeon General

Thirty Years of Service

In April, the Navy Dental Technician Rating celebrates its 30th Anniversary. Over the years, many challenges have been offered and met by Navy dental technicians. The manner in which they have met these challenges, their "can do" spirit, and their devotion to duty have earned them the respect of all with whom they have served. In duty stations throughout the world, Navy and Marine Corps personnel have benefited from the training, experience and competent performance of this dedicated group of men and women.

As an integral part of the health care system, dental technicians provide a wide variety of services in support of the delivery of dental care. The services rendered by dental assistants can vary from direct patient care to performing maintenance on dental equipment. Whatever the task may be, Navy dental technicians are trained to assist dental officers in providing the best dental care available throughout the world. At the same time there has been a real team spirit and a sense of determination to achieve this goal.

The success of dental regionalization has exceeded our expectations. Clinical procedures have increased; control and management of resources have improved; the level of dental disease has been reduced; a



VADM Arentzen

greater degree of patient satisfaction has been noted; line commanding officers have acknowledged and confirmed their acceptance of the system; and, most importantly, the operational readiness posture of our naval forces has been heightened by the improvement in the level of dental health of Navy and Marine Corps personnel. The state of dental health of our active forces has never been higher.

Needless to say, as Surgeon General, I am delighted over this progressive management approach.

This approach is integral with and complementary to our comprehensive program for total health care for our men and women in the Navy and Marine Corps.

For the dental technicians, the future holds a multitude of challenges. To meet these challenges and to seize upon the opportunities available, continuing education is a must. The Medical Department depends on the energy, desire and skill of all our members to fulfill our mission. It has been through those efforts that we have been able to achieve what we have today, and it will take even greater efforts to make our system better in the future. We must provide a personally stimulating and rewarding professional experience. In such a circumstance, delivery of the highest quality dental care is inevitable—just as it is in all health care activities.

Navy dental technicians can be assured of the Medical Department's full support. Together we can meet any new challenges that lie ahead.

A handwritten signature in black ink, appearing to read "W.P. Arentzen".

W.P. ARENTZEN
Vice Admiral, Medical Corps
United States Navy

Department Rounds

Naval Hospital Quantico

Reaching Out at Midway Island

LCDR S. Marc Krenytzky, MC, USNR

An outreach program believed to be unique in Navy medicine is bringing health care to a small, isolated community of military families near Quantico, Va.

The greatest portion of the Marine Corps Development and Education Command lies in Virginia's Prince William County, a highly populated suburban area. But the Command's southernmost portion protrudes into Stafford County, a sparsely populated rural community. Within the area of this protrusion lies Midway Island—a community of 236 military family dwellings geographically isolated from the main base. The houses are small, adjudged substandard, and available only to married enlisted military personnel in the ranks of E-3 and below. The housing is available at lower cost than standard quarters and is assigned primarily to people not eligible to live on base.

Lonely lifestyle. Predictably, in this isolated junior enlisted population there is a multitude of social, emotional, and medical problems. Life at Midway Island can be difficult: the residents are young, sometimes newly married, and separated for the first time from their parents (many of the residents are new parents themselves); only 5% of the houses have telephones; the husband goes to work in the family's only car, leaving his young wife

From the Pediatric Service, Naval Hospital, Quantico, Va. 22314.

Dr. Krenytzky is in the private practice of pediatrics, in Manassas, Va.



Volunteer provides play therapy for children (above); nurse practitioner examines infant with mother's help (right)

without transportation or companionship; and lack of money means there is little relief from a lonely and drab lifestyle.

These problems did not escape the attention of six military wives—all registered nurses—who lived on Midway Island and wanted to help their neighbors. They won the backing of Naval Hospital Quantico, and in January 1976 the Midway Island Community Health Center was established.

The Health Center uses one of two small, general purpose rooms in the Midway Island Community Activities Center. Although it is run



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LT Lynn Blackwood (MSC), clinical psychologist, leads child care discussion



Cheryl Kosits, clinic director (right), helps with a diaper adjustment

under the auspices of the Naval Hospital Quantico Pediatric Service, the Health Center's staff is made up chiefly of volunteers. Nine of these volunteers are registered nurses and wives of active-duty Marine Corps personnel. Staff members work as Red Cross volunteers but wear informal civilian attire rather than the Red Cross uniform. The Red Cross provides liability insurance for the volunteer nurses, all of whom are identified by a Red Cross name pin bearing their first name, followed by the letters R.N.

A pediatric nurse practitioner sees up to 15 patients during a two-hour clinic session. Guidance and counseling are provided by the Midway Island chaplain, a volunteer counselor (also a military wife), and a Navy child psychologist who visits twice a month. Five more volunteers provide play therapy for children during clinic hours.

Vital concerns. Services include free baby sitting, vaporizer and crib loans, well-baby checkups, acute minor illness care, immunizations, and transportation to hospital clinics. Health information and classes are also provided by the nurses. The classes cover a range of topics of vital concern to the families: management of child behavior, newborn care, breast feeding, contraception, nutrition, alcoholism, and marriage problems. Also included, and attended enthusiastically by the families, are discussions of money management, gun safety, and how to handle door-to-door salesmen.

The Health Center has helped resolve the isolation of the families and has begun to foster a community spirit. Even though the center has no fixed budget, it has thrived because of the supportive "help your own" spirit prevalent in the Marine Corps. Total cooperation by the Red Cross, the Naval Hospital,

wives' clubs, and chapel organizations has ensured the Health Center's longevity.

The Health Center augments civilian community resources, and staff members work closely with community social and law enforcement groups—especially to help combat child abuse.

Although difficult to document, the many benefits accruing to the military commands include fewer military members from Midway Island being absent without leave or late for work, as well as lower accident rates among Midway Island service members. That such benefits are real is attested to by the chaplains who work closely with this group, and by their military commands.

Future plans. The work of the Health Center succeeds primarily because of the dedicated efforts of several nurses, including Jo Bahry, Kathy Nelson, Pat Christiansen, Cheryl Kosits, and Brenda Hicks. Also instrumental is cooperation of the American Red Cross, under the direction of COL E.J. Driscoll, USMC. Chaplains Herbert Bergsma and Sol Rubino offered constant inspiration, especially in the center's uncertain early days. LGEN J.C. Fegan, USMC, Commanding General of the Marine Corps Development and Education Command, was wonderfully supportive, especially in renovating the Community Center. Pediatric nurse practitioner LT Donna A. Pence (NC) enthusiastically provided health care, and CAPT R.F. Schindeler (MSC) then commanding officer of Naval Hospital Quantico, was a strong supporter of this project from its inception.

Future plans include applying for a grant to provide free child care service any hour of the day to families in crisis. Funding may also be needed to hire a social worker, because the problems of Midway Island families appear to be more sociological than physiological.

Nephrology Progress at NRMC Oakland

Back in 1952, when NRMC Oakland made first use of its new "artificial kidney," the bulky apparatus looked something like a cross between an iron lung and a space-age washing machine.

Today the "Oak Knoll" hospital's hemodialysis equipment is more compact, but its life-saving mission hasn't changed.

"Dialysis is really a tremendous service available here at Oak Knoll," says CAPT John D. Wallin (MC), head of Nephrology and director of the Clinical Investigation Center at the 413-bed hospital. "It saves the patients a fair amount of money, because the cost of this treatment is quite high in civilian hospitals. Right now, we're taking care of eight patients who would die if they weren't dialyzed three times each week."

Over the last five years, since Dr. Wallin has been at Oak Knoll,

around 55 kidney patients—active-duty Navy, dependents, and retired military personnel—have received dialysis treatment. Of these, 15 have received kidney transplants.

Wallin and his staff of hospital physicians, resident doctors, and corpsmen are active in a number of research projects involving kidney disease and resultant hypertension. Wallin himself has spent much of the last five years working on research into water metabolism as it relates to kidney disease.

"The kidneys filter about 60 gallons of blood each," he says, "but they do a second job on the blood plasma—recovering the water, salt, and other materials the body needs to survive. There are hormones that affect the way water is recovered, and there are drugs used in everyday clinical practice that interfere with the effects of these hormones on the kidneys. My

principal area of research involves looking at the mechanisms with which some of these drugs interfere with the hormones."

One of the more innovative programs at Oak Knoll is the Hypertension Clinic, established three years ago as a research project to see whether a system could be devised to fully care for a chronic disease without requiring extensive physician time.

"What we set up was a clinic that uses a select group of paramedical people whom we trained in the management of hypertension," says Dr. Wallin. "To support them, we use a computer bank that stores all the patient data regarding side effects either to the disease or medications. It then determines the blood pressure and gives recommendations as to medication. This allows the nurse practitioner and regular medical corps people to regulate medication to control the patient's blood pressure."

Thus far, the clinic has treated more than 4,000 patients.

NRMC Oakland is "probably the only place in the country where something like this has developed," Wallin notes, "and we can handle 16,000 annual visits with less than one physician-year of time expended."

A 1962 graduate of Yale University School of Medicine, CAPT Wallin says he has found the Navy to be "full of dedicated young people who are well trained, extremely well qualified, and who practice superb medicine."

"I think we're delivering health care in the upper ten percent of medicine practiced in the country," he adds, "and it's been a very pleasant experience for me."

Dr. John Wallin monitors a patient during hemodialysis. The machine is one of five currently in use for kidney patients at Oak Knoll



—Story by JO3 John Brindley. Photo by PH2 Bob Weissleder.

Notes & Announcements

IN MEMORIAM

RADM William W. Hall, MC, USN (Ret.), whose work in tetanus immunizations saved countless lives, died 6 Jan 1978.

Born in Minto, N. Dakota, on 18 Oct 1892, RADM Hall attended the University of Minnesota and Medical School, receiving his Bachelor of Science degree in 1916, and Bachelor of Medicine and Doctor of Medicine in 1918. He was in the inactive Naval Reserve from March 1919 to June 1920. Returning in June 1920 to active duty in the Navy Medical Corps as a lieutenant, junior grade, he reported to the Naval Hospital, San Diego, Calif., and subsequently served in many naval ships and hospitals, advancing to the rank of Captain in 1942. He served as Chief of the Research Division, BU-MED, from May to September 1946. He was then assigned as senior medical officer of the Puget Sound Navy Shipyard, Bremerton, Washington, where he retired 1 Oct 1949. He was advanced to the rank of Rear Admiral on the basis of combat awards.

RADM Hall received a Letter of Commendation with Ribbon from the Secretary of Navy, which reads in part: "For outstanding performance of duty in connection with the development of tetanus toxoid immunization in the Navy. Beginning his studies with volunteers from the crew of the USS *Relief* in 1934, RADM Hall developed this important factor of preventive medicine to a high degree of effectiveness, enabling the entire student body of the U.S. Naval Academy to receive this immunization in 1938. Prior to and during the period of National Emergency, he recommended the immunization of the Marine Corps and Navy personnel with alum precipitated tetanus toxoid. This method was used by the Navy with the result that no combat casualty in the Navy and Marine Corps developed tetanus during World War II."

RADM Hall was a Fellow of the American College of Physicians, Diplomate of the American Board of Pathology in Pathologic Anatomy and Clinical Pathology, Diplomate of the American Board of Internal Medicine, Fellow of the College of American Pathologists, and Member of the California Society of Pathologists. He held the Legion of Merit with combat "V", Navy Commendation Ribbon, World War I Victory Medal, Second Nicaraguan Campaign Medal, American Defense Service Medal, American Campaign Medal, Asiatic-Pacific Campaign Medal with two bronze stars, and the World War II Victory Medal.

CAPT Milton R. Wirthlin, MC, USN (Ret.), a former Navy physician who served 30 years with the Navy Medical Corps, died 13 Feb 1978 in Little Rock, Ark.

Born in Minturn, Ark., on 9 May 1905, CAPT Wirthlin received his Bachelor of Science degree in 1927, and his M.D. degree from the University of Arkansas School of Medicine in 1929. He was commissioned a LTJG in the Medical Corps of the U.S. Navy on 4 June 1929, and interned as ward medical officer at Naval Hospital, Brooklyn, N.Y., and in the out-patient department of the Third Naval District Headquarters. In December 1930, he was assigned to the naval base at Guantanamo Bay, Cuba, and after six months was reassigned as medical officer on the USS *Brazos*.

CAPT Wirthlin subsequently served in many duty assignments including two years with the Physical Qualifications and Medical Records Section at BUMED. He then joined the USS *Massachusetts*. While on board that battleship, he participated in Atlantic patrols off Norway, the landings at Casablanca, Pacific operations in the Gilberts, the occupation of Kwajalein and Majuro atolls, the Truk and Marianas attacks, and raids on Palau, Yap, Ulithi, and Woleai.

CAPT Wirthlin returned to BUMED in 1944, as assistant to the personnel officer. In 1945, he reported as executive officer at Naval Hospital, Annapolis, Md. After a course in general surgery at the University of Pennsylvania, he served on the surgical staff at Naval Hospital, Oakland, Calif., and as Chief of Surgery, Naval Hospital, Newport, R.I. This was followed by a tour as executive officer at Naval Hospital, Quantico, Va.

He was officer in command of the hospital aboard the USS *Consolation* when the helicopter deck innovation was initiated for Korean combat medical evacuation, and also during the resettlement of Vietnamese civilians. He then commanded the naval hospitals at Quantico, Va., and Newport, R.I. His last tour of active duty was as senior medical officer of the Naval Station, San Diego, Calif., and as assistant district medical officer, Eleventh Naval District.

After retiring from the Navy in 1959, Dr. Wirthlin became County Medical Director in Pine Bluff, Jefferson County, Ark., and was President of the Arkansas Public Health Association from 1962 to 1963. In 1969, he was medical officer for the Contra Costa County, California, Health Department. He returned to Little Rock, Ark., in 1973, where he lived until his death.

CAPT Wirthlin was a Fellow of the American College



CAPT M.R. Wirthlin
1905-1978

of Surgeons and held the Navy Commendation Medal, China Service Medal, American Defense Service Medal, American Campaign Medal, Asiatic-Pacific Campaign Medal with three stars, World War II Victory Medal, National Defense Service Medal, Korean Service Medal, United Nations Service Medal, and the Vietnamese Presidential Unit Citation.

SURGICAL PATHOLOGY COURSE SET FOR JUNE

The Armed Forces Institute of Pathology (AFIP), in collaboration with the American Registry of Pathology, will hold a Surgical Pathology for General Surgeons course 12-16 June 1978. This is the first course to be given at the AFIP designed specifically for the general surgeon.

Course content will cover lesions of organs and systems handled by general surgeons, and lesions which a general surgeon may encounter in emergencies or in geographic areas where surgical specialties are not readily available.

There will be no registration fee for military and other federal attendees. The registration fee for non-federal participants will be \$250. All participants in this course will receive AMA continuing education credits.

Military and federal surgeons may obtain further information by writing to: The Director, Armed Forces Institute of Pathology, ATTN: AFIP-EDE, Washington, D.C. 20306. Nonfederal surgeons may write to: The American Registry of Pathology, ATTN: Dr. C.H. Binford, Armed Forces Institute of Pathology, Washington, D.C. 20306.

DENTAL CORRESPONDENCE COURSE REVISED

The Dental Corps has revised its correspondence course, "Operative Dentistry" (NAVEDTRA 10759-B), designed for dental officers in general practice. The course is based on the text *Principles and Practice of Operative Dentistry*, by G.T. Charbeneau, et al. (Lea and Febiger, 1975).

In six assignments, the course covers examination, diagnosis, and treatment planning; occlusion, caries, periodontal aspects of operative dentistry, and preventive measures; instrumentation, the biologic basis of restoration, and general operative treatment procedures; amalgam restorations; cohesive and cast gold restorations; and conservative complex esthetic restoration of devital teeth. It is evaluated at 12 points for Reserve retirement credit by the Armed Forces, and for continuing education credit by the Academy of General Dentistry and 10 states. Dental officers who completed the former course in "Operative Dentistry" (NAVPERS 10759-A) may receive full credit for this course.

The course in operative dentistry is one of a series of correspondence courses sponsored by the Dental Divi-

sion, BUMED. The courses are open to all dental officers on active duty with the U.S. Armed Forces or other Federal agencies, to Reserve officers on inactive duty, and to dental officers of armed forces of friendly nations.

Descriptions of the courses, eligibility requirements, and application procedures are given in *U.S. Navy Dental Corps Correspondence Course Program*, NAVMED P-5081, which is available from the Commanding Officer (Code 413B), National Naval Dental Center, Bethesda, Md. 20014.

MEDICAL FILM AND VIDEOTAPE CATALOG UPDATED

The HSETC Medical Film and Videotape Catalog has been updated. Return all catalogs dated before 1978 for recycling to: Audiovisual Resources Division, Code 26, Naval Health Sciences Education and Training Command, National Naval Medical Center, Bethesda, Md. 20014.

The updated catalog will be remailed to you within one week after receipt. Please enclose a self-addressed mailer with your old catalog.

NEW ORGANIZATION FOR NAVY EMERGENCY MEDICINE PHYSICIANS

Last year MAJ Gerald Whelan, an Air Force physician at Malcolm Grow USAF Medical Center, gathered five members of the American College of Emergency Physicians (ACEP) to sign a petition that resulted in the official recognition by ACEP of a government services chapter.

The first organizational meeting was held last November during the ACEP Scientific Assembly in San Francisco, Calif. Chapter by-laws were tentatively accepted, and an ad hoc committee was formed with MAJ Whelan as chairman.

The committee's goal is to circulate information about the new chapter and to encourage membership. Formal election of officers, appointment of committees, and other matters will be handled at the 1978 ACEP Scientific Assembly in Texas.

Government services chapter membership is open to any federal physician actively involved in emergency medicine. Physicians who are already active in ACEP and are interested in joining the government services chapter may telephone (517) 321-7911. Applications to join ACEP may be obtained by writing to: American College of Emergency Physicians, 3900 Capital City Boulevard, Lansing, Mich. 48900. Application fee is \$20.

Navy physicians who decide to join the government services chapter should notify CDR Steven J. Hazen, MC, USN, Chief, Clinical Medicine Branch, Department of Family Practice, NRMC Jacksonville, Fla. 32214. Telephone (904) 772-5321 or Autovon 942-5321. CDR Hazen will keep a list of Navy ACEP members.

On Duty

Dental Technician:

A Life with Goals—and Rewards

It's no secret that a child's first experience in a dental chair can make him a reluctant dental patient in later life.

In his work at Naval Regional Dental Center, San Diego, DT2 Robert M. Fraser sees a number of apprehensive patients who would have gone out of their way to avoid dental care if regular dental checkups were not mandatory in the Navy.

A clinical dental technician at the Navy's newest and most modern dental facility, Fraser has made it his personal goal to make each patient's visit as pleasant as possible. "If you can provide good treatment and show that you're conscientiously interested in the patient as a person, not just a number, that patient is going to come back."

Fraser, the leading petty officer of the Oral Diagnosis Department, and other staff members were instrumental in providing a smooth transition after NAVREGDENCEN moved from its old quarters last June into a new, consolidated facility.

"I've seen more people come back on their own for treatment, since we've moved into this building, than I have in my last 11 years in Navy dentistry," says Fraser. "It all depends on the care you give, and most of the people are happy about the service here."

The Naval Regional Dental Center Headquarters has seven clinical departments which include operative dentistry, periodontics, oral diagnosis, endodontics, preventive dentistry, oral surgery, and prosthetics. Currently, the clinic is staffed by 32 dentists, 15 laboratory technicians, and 34 clinical tech-



DT2 Fraser pulls a dental chart (above) and assists Dr. Manuel Carrillo (left) with an oral examination. Photos by Bob Weissleder

cians. The regional dental center and its branch dental clinics were responsible for treating the 432,000 active-duty and retired patients seen last year in the San Diego area. The center supplies and services several branch clinics from North Island to as far away as El Centro, California, 120 miles to the east. Patients from ships that do not have dental facilities are treated on a priority basis.

For Petty Officer Robert Fraser, as for many more of the Navy's dental technicians at other commands, the technician's job has an intangible but highly satisfying benefit.

"When someone calls you back for an appointment and specifically asks for your assistance, "Fraser says, "you have your reward."

—Story contributed by JO3 John Brindley.

Medical Records – Good and Bad

Dorothy C. Rasinski, M.D., J.D.

In today's medicolegal climate, practitioners of medicine have been admonished *ad nauseam* about the need to keep accurate, clear medical records. If we physicians were to follow all this advice, we would become like squids, propelling ourselves backwards by the expulsion of great quantities of ink.

Memorizing a litany of platitudes or mechanical "Dos and Don'ts" on medical recordation is not necessary. Rather, the physician should be encouraged to develop a conceptual and attitudinal approach to medical records that will make him or her more effective in recordation, and will therefore conserve both time and effort.

It is important at the outset to list four empirical assumptions that are accepted as "Gospel" by most medicolegal experts:

- A bad result and a bad record equal liability, *regardless* of the quality of care rendered.
- In a malpractice trial, medical records are the most important evidence, *regardless* of the facts.
- Although physicians may be the "medical experts," attorneys have become the "medical records experts."
- As experienced defense attorneys frequently counsel their defendant-physician clients: "If you have done everything you should with your medical records, I will be able to do everything I can for you in defense of a medical malpractice suit."

Why such great emphasis on medical records?

The answer lies in the relationship of medical records to the "standard of care"—and, in particular, to the manner in which the law uses medical records to determine whether or not a physician has deviated from the standard of care. In actual practice, it is difficult to consider these two concepts independently.

In malpractice cases, the court is primarily concerned with assessing a physician's professional conduct to determine whether such conduct deviated from the standard of care required by the law and by medicine. Professional records are a legal index or guide to one's professional conduct. They relate directly to a physician's capability and, in a very special way, to his credibility *as a matter of law*.

Dr. Rasinski is assistant chief, Division of Legal Medicine, Armed Forces Institute of Pathology, Washington, D.C. 20306.

There is a feeling common among physicians that judges are attempting to tell them how to practice medicine. In support of this contention, the cases *Helling v. Carey* (83 Wash. 2d 514, 519 P. 2d 981, 1974) and *Canterbury v. Spence* (464 F. 2d 772, 1972) are often cited. In both these cases, in finding negligence, the court appeared to ignore or overrule a thoroughly accepted medical standard of care. In the first case, the standard of care related to screening procedures for glaucoma; in the other, to a test of the adequacy of "informed consent" prior to a surgical procedure.

The courts' opinions in these cases were not really directed to physicians but were intended to put practicing attorneys on notice. In these opinions and others like them, courts have attempted to identify what they feel are the most significant features, characteristics, and aspects of professional conduct. The courts are not specifically concerned with who should be given a glaucoma test, for example—they admit they lack the expertise to make such a determination. Rather, the instructions given in a legal opinion are for application, not to the issue of how to practice medicine, but to how a physician should conduct himself in a professional manner.

Many times, in effect, courts' opinions mirror society's expectations. The hoped-for result is that attorneys will become more adept at assessing professional conduct and developing a workable, meaningful concept of a "standard of care" as a reasonable guide to acceptable conduct.

Because legal opinions represent a retrospective analysis, courts and attorneys must rely heavily upon medical records. Therefore, judges are instructing attorneys as to what to look for in the medical record, especially as it may be a barometer of the standard of care delivered by the physician.

The "standard of care" is a difficult and subtle concept because it tends to be predominantly subjective in nature. All physicians ask for a formula or definition, an objective guide as to what the standard of care is. "If I knew what it was, I would follow it," they tell us.

Unfortunately, there are no cookbook responses to such inquiries. But a condensed answer is that "standard of care" is the requirement that a physician "use his best judgment under the circumstances." This is

not a simple abstraction, but rather a legal term of art, developed over the course of years within the common law. It provides us with those guidelines we must apply to discern our legal duties as professionals.

The problem is that this requirement is deceptively simple. As a result, some physicians have attempted to use it as a shield when a bad result occurs during the course of their professional performance. They say, "I used my best judgment," as if there were something magical in the phrase. But this naked assertion is insufficient to provide an adequate explanation of behavior, and it may be inherently self-serving in nature.

THE 'BEST JUDGMENT' REQUIREMENT

To understand how the requirement to "use one's best judgment" relates to medical records, it is important to examine the two elements that fall under the requirement: (1) A physician must possess knowledge, and (2) he must exercise or apply that knowledge in a skillful and careful manner. These are the essential prerequisites that allow a physician to rely upon his professional judgment. And they relate in a very specific way to medical records.

It is incumbent upon the practicing physician to demonstrate these elements in his medical records, if at some later point he hopes to be able to use them to justify his professional behavior and conduct. Let us examine these crucial elements more closely.

Possession of knowledge. This element requires a demonstration that a physician is qualified to act on his judgment. "Knowledge," to the law, means education, training, and experience. *Education* refers to medical education, which is grounded in the biosciences, i.e., in the pathophysiologic mechanisms of health and disease. Courts are quite impressed with science. They recognize that it is somewhat beyond their expertise. They give immense credibility to behavior or conduct that is put in a scientific framework. *Training* is the second aspect of knowledge, and it refers to clinical experience and the "art" of medicine. It is reflected in certain procedures such as history-taking and physical examination. The third aspect of knowledge is *experience*, and this refers to the utilization and application of the physician's medical education and training.

Medical records should be a pertinent demonstration of a physician's application of education, training, and experience to a particular case or situation—not merely a pedantic parade of medical jargon. It is important that the records reflect some evidence of familiarity with the so-called Medical Model, i.e., medical methodology. While there is a legal presumption that a graduate of an accredited medical school, who possesses a state license, possesses medical knowledge, this presumption is not conclusive. It can be rebutted if the physician has made such careless mistakes in his workup as recording frivolous comments, including the vernacular, or mak-

ing moral judgments. For example, consider the physician who writes in his chart, "Joe's problem is his wife: she's a bitch on wheels," or "If this man spent less time running around with floozies and hookers, he would not have an ulcer." Both these statements may be accurate, but they are not couched in terminology that reflects medical training.

Again, the physician is evaluated *qua* physician, that is, in his role as a physician. One should not forsake evidence of his or her professional discipline or method by becoming too informal or nonmedical in recordation.

Application of knowledge. The second element of the "best judgment" requirement is that the physician must exercise or apply his knowledge in a skillful and careful manner. There is no presumption that a physician always automatically does so. Therefore, courts carefully scrutinize this aspect of a physician's professional conduct.

"Skill," in the eyes of the law, represents clinical competence, i.e., the effective and judicious utilization and application of medical knowledge. At the very least, this would seem to require that medical records (1) establish the probable cause of the patient's problem, (2) justify the diagnosis, and (3) delineate the treatment and management. This, in effect, means gathering salient facts and formulating them for use in the differential diagnostic process. The bland assertion that "Mrs. Jones has a URI" is of no medical value. A receptionist or an untrained layman could reach the same conclusion. It requires no special training and certainly evinces no professional skill.

A very crucial aspect of medical recordation is the formulation of a differential diagnosis. The medical records should tell a clinical story of the patient's problem, not in the form of a simple narrative or a technical task easily performed by nonphysicians.

The formulation is a process of *rational decision-making*, i.e., selecting those pathologically germane facts and synthesizing them into a differential diagnosis. This is the crux of the medical professional's mental processes. Medical records give clues about one's professional thinking. They also can be used to minimize the risk that diagnostic or therapeutic decisions will be impugned or perverted at trial by the plaintiff's counsel.

It should also be noted that the professional conduct of the physician must be consistent with the formulation as reflected in his medical records. If not, the medical records should somehow reconcile, by appropriate comment, the disparity between thought and action. Failure to provide such reconciliation has been responsible for raising a substantial inference of incompetence on the part of a defendant physician.

An additional qualification should be made about the "best judgment" requirement. That requirement relates to one's best judgment "*under the circumstances*." Therefore, it is important that we record

special circumstances under which the patient is evaluated. For example, the circumstances of an emergent or urgent situation, or the fact that one was dealing with a hostile, uncooperative, intoxicated, or incompetent patient, should be recorded.

THE 'REQUIREMENT' AND MEDICAL RECORDS

Two court cases can be cited as examples to illustrate the legal meaning of the "best judgment" requirement and its relationship to medical records.

In one case, a newborn was found to have a serious Rh incompatibility. Exchange transfusion was begun on the date of birth. The physician decided to halt the exchange prematurely, when the infant became cyanotic, and it was not resumed for four days. In the interim, the infant developed deep jaundice and kernicterus.

The physician was accused of negligence in delaying the exchange transfusion. He testified at trial that he had been aware that the bilirubin level was vitally important in the care of this patient, and that he had ordered serum bilirubin levels every eight hours, as well as constant monitoring.

The medical records, however, did not corroborate the physician's testimony. There was no indication in the records that the infant had remained cyanotic, or that any tests had actually been performed. No results of such tests were recorded, and there was no evidence in the medical record of any monitoring. That physician's records, therefore, became a source of suspicion, especially with reference to his credibility. They also raised doubts about his capability and competence.

The court held that sufficient evidence could be adduced to raise the inference that the physician had not undertaken adequate analysis upon which to exercise his professional judgment. The court concluded that the decision to delay the transfusion was *not* based on *careful analysis*; therefore, the physician was found to have been negligent.

While in that instance medical records impaled the physician, they can be of redeeming value in cases where bad results ensue or poor judgment occurs. This can be seen from our second example.

A 5-year-old girl presented with right-lower-quadrant abdominal pains and a history of vomiting and fever. She was examined by a physician who ordered a CBC and flat and upright X-rays of the abdomen. The films disclosed a localized reflex ileus.

The physician's diagnosis was tonsillitis, for which he prescribed penicillin. The patient was then sent home. A few days later, the child was admitted to the hospital with a ruptured appendix and peritonitis.

The physician's medical records indicated that he had examined the abdomen but had found insufficient signs upon which to base a diagnosis of appendicitis or of an acute abdomen. The tonsils had appeared red. The physician said he had felt that the white blood count was more compatible with tonsillitis than with

other disorders, under the circumstances.

The patient was deemed entitled to a thorough examination, conducted with customary diligence and methods of diagnosis. (Presumably, these include history, physical examination, and laboratory tests.) The diagnosis of tonsillitis had been based on physical examination and laboratory findings; it was supported by evidence in the medical records and not based solely on intuition. Therefore, even though the findings were consistent with other disorders, the physician was not considered to have been negligent. Thus, it can be seen that in many cases the actual diagnosis may be less important than the *means* or *method* by which it was reached.

"Professional judgment" can be a shield from liability that may follow an error in diagnosis, but only when *careful formulation of the problem* turns out to have led to the incorrect diagnosis. And medical records are the best evidence of careful formulation.

Laymen cannot conceive of or appreciate the complex nature of the diagnostic process. The law formally recognizes this complexity; and its recognition is reflected in certain procedural requirements of malpractice cases, in particular the requirement that the standard of care be generally set by an expert medical witness, i.e., a qualified physician. This is tacit recognition of the uniqueness and uncertainty of clinical medicine. However, if we become careless in adequately and accurately recording our method and discipline, we may convince courts that the diagnostic process is not as complex as has heretofore been believed. This is especially true if we do not use proper terms and methods that reflect our medical education and training. If this happens, we may well lose some of the procedural privileges we now possess in the trial of malpractice cases.

Medical records should reflect the complexity of a difficult clinical problem. If they do, they will demonstrate to a court that the proper professional attention has been given to the medical problem. The law does not ask much more. If one is aware of what the law requires in medical recordation, he will be protected, and good medical care will be promoted.

IMPORTANCE OF GOOD RECORDS

It has been said over and over that one of the most important things a physician can do to protect himself and reduce his malpractice exposure is to keep good medical records.

It is estimated that 20% to 25% of the malpractice claims referred to the Legal Medicine Division of the Armed Forces Institute of Pathology are rendered indefensible or are seriously compromised because of inadequate medical records. This has cost the government hundreds of thousands of dollars each year for the last several years, to say nothing of the loss in the private sector. The problem has manifested itself in increased risk of suit; increased percentage of losses;

increased amounts in settlements paid, verdicts rendered, judgments awarded; and increased malpractice insurance premiums paid by the profession at large.

Why are medical records so critical to such a large percentage of claims? One reason is that most physicians see too many patients to have any independent memory of their contact with any single patient. Furthermore, the trial of a medical malpractice suit may occur anywhere from two to ten years after the alleged negligent act. The medical record therefore becomes invaluable to the defense, because memory alone is less than worthless, and the record may serve to refresh the doctor's recollection of events long past.

Judges and jurors are likely to be suspicious of any physician who lacks a record of some vital fact essential to his defense. When, as often happens, a lawsuit becomes a question of "Whom do you believe?"—the patient, testifying "He didn't," or the doctor, testifying "I did"—the availability of contemporaneous records corroborating the doctor's recollection will frequently tip the scale of credibility decisively in his favor.

An attorney will have several basic concerns in reviewing a medical record.

First and foremost, he will want to be sure that it is legible, though he often may not understand the physician's comments and observations. An illegible scrawl may be the way we were forced to learn to write to keep up with lecture material in medical school, and this habit may unfortunately follow through to the writing of progress notes, orders, or prescriptions. But the plaintiff's counsel or the defense attorney or judge who reviews such a record will not be particularly impressed by that excuse. The attorney may not be able to write any better than you can, but his actions are not on trial.

For the sake of the defendant physician and his attorney, then, records should be kept in good condition. It is very distressing to the defense counsel to have to introduce evidence based on taped-together, dog-eared, coffee-stained, and ink-blurred documents that may be impossible for even the defendant to read—or that contain illegible scratchings and abbreviations known only to the recorder and God. These records may be admissible and may constitute the entire "defense," but they certainly will not help the defendant's professional image.

Sloppy records have also resulted in overdose deaths. The problem of decimal point errors should be considered: e.g., the matter of 3 N against .3 N saline, or 25 mg Compazine against 2.5 mg for a child.

Lest one be misled, primary-care physicians are not the only ones who make these mistakes. Others, including pathologists, can be involved.

One example occurred during a criminal trial based on the death of a woman during an illegal abortion attempt. Analysis of brain tissue showed the presence of chloral hydrate. Considering the pathologist's analysis of the percentage of chloral hydrate in the brain and the victim's body weight, the defense counsel calculated

that the woman had ingested 20 chloral hydrate capsules, which could be considered a suicidal dose. The court had no choice but to find reasonable doubt as to cause of death and acquit the accused on the manslaughter charge, although it found him guilty of attempted abortion.

What had happened? The pathologist had misplaced his decimal point. If one moved the decimal place one point to the left (where it belonged) in the pathologist's report, calculations would show that before undergoing the attempted abortion, the woman had taken only two chloral hydrate capsules, a reasonable dose.

There was no way out of this decimal point trap. Not only were there criminal implications, but also the error might have been compounded if claim had been made that death had occurred within the two-year suicide presumption clause of the decedent's life insurance policy, and her heirs had been able to recover only premiums paid plus interest, instead of the face value of the policy.

Radiologists, too, can be involved. In another case, a radiologist had been criticized by his chief for rubber-stamping "normal chest" on X-ray reports. Perhaps the radiologist thought to himself, "Okay, the next routine pre-op chest film I see will really get a thorough commentary." And the next "routine pre-op" chest film to cross his desk belonged to the husband of one of the hospital's record-room employees. The patient had been admitted for elective cholecystectomy. The radiologist dictated this very extensive report:

Examination of the chest reveals normal thoracic cage. The diaphragms are symmetrical. The heart is normal in size. The aorta is slightly tortuous. The cardiac configuration suggests a remarkably fit individual who certainly has a heart many years younger than his stated age of 55 years. The anterior musculature of the chest wall is also quite prominent, again suggesting a very vigorous and healthy person who has lived a clean life and must be the product of an extremely happy home life and excellent care. CONGRATULATIONS TO HIS WIFE.

Normally, of course, a routine preoperative chest film is taken to demonstrate any pulmonary pathologic condition that might contraindicate the use of general anesthesia. But this report, though extensive, makes no mention of the lung fields.

Further, by the time the X-ray report had found its way into the medical record, the patient was in the morgue, the victim of a clostridial wound infection and peritonitis. The widow's associates in the record room were quick to point this out to her, and she filed suit. If the surgeons who had treated her husband had as cavalier an attitude as the radiologist, she reasoned, the "malpractice" or lack of concern for her husband was obvious.

Fortunately, there was no malpractice in the surgical care and postoperative treatment of this patient. But if there had been some question and the case had had to be tried on its merits, one can imagine the consternation in trying to explain the radiologist's comments,

even though he had had no direct involvement in, or relationship to, the patient's demise. The moral here, as we mentioned earlier, is "Keep your remarks in the chart professional."

Another case in which frivolous comments were made involved a patient who entered a hospital for regulation of L-dopa treatment for Parkinson's disease following bilateral chemopallidectomy. A neurologist had been called in consultation, and in his physical examination remarks, under "neurological status," he wrote: "No pathological reflexes, except pink slippers."

Two weeks later, the patient was brought by his wife to the emergency room of the same hospital for treatment of chest pains, shock, difficulty in breathing, and cyanosis. An electrocardiogram revealed evidence of acute myocardial infarction, but the tracing was read by a surgeon resident, who had no experience with cardiograms, as "perfectly normal." The patient was sent home, where he died that night in bed.

Obviously, the defense would have to answer an allegation of malpractice in the handling of the cardiac problem. But the extraneous, inappropriate comment regarding the patient's neurological status—made two weeks before the patient's death, under entirely different circumstances—only added to the "damages" in this case, and to the widow's mental anguish and distress.

Such remarks have no place in a medical record. Nor should the record be used—in the hospital, the outpatient clinic, the office, or anywhere else—as a battleground for a running feud.

For example, one internist had always referred his patients who required surgery to a particular surgeon noted for his technical skill but not for his knowledge of postoperative intravenous fluid management. The surgeon operated on a patient referred to him by the internist and then went ahead to write his own intravenous fluid orders. The internist came by later the same day and, dissatisfied with the surgeon's instructions, wrote across the progress notes, "This horse's --- may know a lot about surgery, but he knows absolutely nothing about fluids. Fluid orders changed—see order sheet."

The surgeon made rounds early the next morning and wrote in the patient's progress notes, "If I am such a horse's ---, why do you keep calling me back to do your surgery?"

Unfortunately, the patient died of cardiac complications.

Absolutely no negligence or malpractice was involved in this case. But can anyone imagine the defense of this kind of record, if suit were ever brought? Obviously such a case would have to be settled out of court—the plaintiff's attorney sitting back comfortably relaxed while the defendant surgeon and the defendant internist argued about who was really responsible.

Another example of an unfortunate, frivolous comment in a record involved a patient who suffered a cardiac arrest during delivery and remained in a coma for months. The medical record contained a laboratory slip that had been sent, together with spinal fluid, to Bacteriology for culture. Under the heading "diagnosis," someone had written "postpartum blues." What a field day some plaintiff's attorney could have with that one!

ALTERATIONS IN THE RECORD

Perhaps the most prevalent type of malpractice bungler is the doctor who tries to make himself look better in hospital or office records after a claim notice has landed on his desk.

It is bad enough to dictate records that do not adequately summarize diagnosis or treatment. But giving in to the temptation to alter the records when one is sued, or when there is a bad result, no matter how justified one feels, can be even more disastrous. If the alteration is subsequently proved in court, juries universally incline toward a commonsense question: If the doctor has nothing to cover up, why does he need to meddle with the records?

Consider the case of a 4-year-old child with a three-month history of rectal bleeding. Clinical examination and workup revealed the presence of three sigmoid polyps, and laparotomy was performed to remove them. The patient did well immediately after the operation, but on the second day she became lethargic, developed a temperature of 102° F, and made some inappropriate comments. At this point, serum electrolyte determinations revealed the sodium content to be greater than 170 mEq/liter and the chloride to be 122 mEq/liter.

The case was reconstructed as follows. The physician who had written the orders for intravenous fluids had wanted one-third normal saline given, and had written his order as "1/3 N saline"—or at least this is what he later insisted. In taking the order off the physicians' order sheet, the nurse had seen the "3" but not the other items, and had continued to hang up bottles of 3 normal (3 N) saline.

When the error was discovered, 48 hours later, the physician rewrote his order, now convincingly expressing it as a fraction. The nurse denied that it had been written that way originally, insisting that she had seen no fraction. But the correction was obvious from the different size of the symbols, the different pen, and the heavier strokes used.

When the malpractice claim was filed, the nurse's notes were as originally written. If the physician had bothered to *read* them daily, he might have caught the error much sooner, and the tragic end could have been avoided. The child died of renal shutdown. The parents recovered \$20,000 in an out-of-court settlement. There is no way that such a gross alteration of the records

could have been successfully defended in court.

Any alteration of a medical record, no matter how innocently undertaken, can be turned into something ominous by a discerning cross-examiner. Alteration of the record raises the implication that there is wrongdoing. If the claimant is ever able to bring to the attention of the court the fact that the medical record has been altered, the value of the claim increases substantially.

What should one do if a record needs changing? If one feels that an entry in the record must be changed, a simple thin line should be drawn through the entry and the correction or change made, initialed, and dated, so that everyone will know who made the change, when it was done, and what the original entry was. An explanatory note should then be added in the progress notes. A note is preferable to "covering up" a record. Sometimes an erroneous order may require redoing, but it should not appear that someone is trying to cover up or hide something.

OTHER PROBLEMS

In the military medical sector, the physician should not forget that patients and their families have ready access to their records. They can and do add extraneous comments regarding diagnosis, treatment, and what they interpret as inadequacies in their care. One should watch especially for unsigned entries, entries written in the margin, those with frequent gross spelling errors, and those that use lay terminology rather than appropriate medical language. For example, this entry was found in outpatient progress notes, its date corresponding to a time when the patient was hospitalized, and its remarks referring to a fall from bed and an associated head injury the patient claimed to have suffered:

Patient fell out of bed AM-heavily sedated No guard rails on bed. Big lump on base of ~~sekal~~ head. Left shoulder and back hurt 1 leg grossly burred black and blue. Complained of pain Guard rails were put on bed after patient fell out of bed. X-ray of head. Neg.

It's easy to guess who inserted this gratuitous comment in the record, and why.

This brings us to another moral: Read all pertinent entries in the record, whether they are lab slips, X-ray reports, or nurses' notes. It's surprising what may be found.

An example is the case of a child brought into an emergency room with the usual "URI". The mother complained that the child had been febrile for several days. The physician ordered a CBC; the result reported included a white count of 10,000, with an essentially normal differential for a child of the patient's age. And that is all the doctor saw. He never noted the hemoglobin of 2.6 and hematocrit of 7.8.

Two days later, the patient was brought back, essentially DOA. At postmortem, the child was found to have died of overwhelming pneumonia, with hypoplastic

erythroid elements in the bone marrow and no stainable iron. It's possible that this death could have been prevented had the doctor looked at the entire lab report.

Another example involved a military dependent being treated at an outlying dispensary for upper respiratory symptoms. A chest X-ray of the child was read as suggestive of miliary tuberculosis. But the doctor who ordered the film and received the report just stuck it in his bottom desk drawer while he prepared to go on a month's leave. No one else knew of this diagnosis.

Three weeks later, the child developed a headache, became lethargic, and was hospitalized. Results of a spinal tap were somewhat confusing. By the time a repeat chest X-ray had been taken and read, a bony lesion had developed and was seen to cross the epiphyseal plate in the proximal humerus.

Antituberculous therapy for the tubercular meningitis was not begun until 24 hours after admission. The child never recovered. Whether he would have survived had the diagnosis of tuberculosis been previously communicated and the disease treated earlier is impossible to say. But the government could not prove that death was inevitable in any event, and so it settled the claim.

All progress notes should be written in a timely manner. Operative reports, particularly, should be dictated as soon as possible, especially if the surgery is complex, involved, or long, or if complications ensue. It is difficult, if not impossible, to defend a malpractice suit alleging negligent performance of surgery where the typewritten operative note was dictated six months after the procedure was performed and reads like a textbook, describing no complications or problems. Progress notes, handwritten two or three weeks after the procedure, may give contradictory information and may describe results of intra-operative inadvertencies, errors, or difficulties. These are knotty problems for the defense counsel to reconcile. Recommendation: Settle out of court.

The progress notes of the treating physicians should present a logical, chronological development of the patient's course, i.e., diagnosis, treatment, response to treatment, and any alteration in the therapeutic plan. Sometimes physicians get bored with writing "status quo," day after day, for a patient who may be treated and followed over a long course with little apparent change from one day to the next. But the failure to make some notation may create a problem, as in this instance of the lack of progress notes for 16 days on a patient critically ill with a head injury.

The patient was hospitalized so that he could be monitored for signs of a developing subdural hematoma. Neurological changes were subtle, and were either missed or not looked for. It was impossible to tell which, because there were no physicians' progress notes and no orders during that time. There was no way to prove that the patient had even been seen daily by a physician!

The patient was somewhat dysphasic and occasion-

ally confused, intermittently complained of chest pain and hemoptysis, and occasionally was febrile during that interval, according to the nurses' notes. Finally, a nurse noted that his ankle was red, swollen, and apparently tender. She put the patient on bed rest, elevated the leg, and applied hot packs, telling the physicians who were "treating" him that she thought he had a sprained ankle. A few days later, according to the progress notes, one of the physicians became suspicious that this might be acute thrombophlebitis and requested medical consultation, which confirmed the diagnosis and recommended anticoagulation therapy.

Heparin was begun, but apparently no thought was given to the original problem that had prompted the patient's hospitalization. Within a few days, the patient became comatose, and studies revealed bilateral subdural hematomas. Anticoagulation therapy was stopped in preparation for surgery. At operation, bilateral burr-holes confirmed the presence of two subdural hematomas, one fresh and the other "old," comparable in age to the time of the original injury several weeks before.

Apparently, when anticoagulation was reversed, no thought had been given to the patient's thrombophlebitis or the possibility of pulmonary emboli (or the fact that earlier episodes of chest pain, fever, and hemoptysis may have been due to such emboli). One day postoperatively, the patient awoke, sat up, clutched his chest, groaned, and fell over dead from massive pulmonary embolization. Had daily, careful observations been made and noted in the record, his death might have been avoided.

RECOMMENDATIONS

Experts in the field of medical records recommend, as a minimum, six categories of information for records:

- an exhaustive history;

- a description, recorded as nearly as possible in the patient's words, of the present ailment or injury;
- a report of physical examination, showing objective findings on subjective complaints;
- a record of diagnostic aids used and any reports received concerning the patient;
- an impression of diagnosis (when a physician is able to form only an impression, in the absence of additional diagnostic procedures, he should avoid use of the word diagnosis);
- a record of treatment, including any medication prescribed, and the procedures recommended or performed.

A record of any visit by the patient to the physician should be carefully maintained, lest it later be suggested that the doctor failed to employ due diligence, or even that he abandoned the patient. This record should document response to therapy, any change in diagnostic impression, and any new diagnostic procedures to be undertaken.

Obtaining an adequate written consent to surgical procedures or any extraordinary mode of therapy can be highly significant. Notations on the medical record should be made whenever a patient refuses a diagnostic aid, such as X-ray photographs; discontinues treatment, as when he rejects his physician's recommendations; or when, against medical advice, he leaves the hospital to which he has been confined.

At the time of a complaint or trial, the medical record may be one's only source of information regarding the diagnosis, treatment plan, and final evaluation. Keeping carefully prepared, complete, accurate, legible, and timely medical records is not an additional duty of the physician, but part and parcel of the *practice of good medicine*. It should be an indispensable, *no exception* principle.

Good medical records bespeak good medical care. Sloppy records and sloppy thinking may raise a presumption of sloppy medical care. And that is an awfully difficult presumption to rebut.

Hobbyists and Do-It-Yourselfers Beware

During this season, many hobbyists and do-it-yourselfers are busy on projects in their garages and basements. Even though recent years have seen increasing emphasis on home use of protective equipment, such as safety goggles, other measures are needed.

Rare is the individual who doesn't at some time engage in a home project—even such a commonplace

task as assembling an electronic kit or refinishing a piece of furniture.

But equally rare is the individual who recognizes the potential hazards of some of the materials used in such activities: paint thinners and strippers, glue, epoxies—in fact, the whole array of materials that in industry are used under strict surveillance.

The person who is provided at

work with an organic vapor respirator and a well-ventilated environment may go home and ignore precautions in his hobby work.

Probably the most common oversight is failure to ensure adequate ventilation. In any case, hobbyists should know what materials they are working with (read the labels!), and take precautions accordingly.

—NEHC Occupational Health Notes

Safety Tips

Use of Ethylene Oxide in Hospitals

CDR John P. Swope, MC, USN
BUMED, Code 416

Ethylene oxide (EO) is an almost indispensable chemical for sterilization of certain items in hospitals. But use of this chemical has brought to light some facts indicating that EO may have mutagenic properties. Thus it should be used only when other sterilization processes would not be effective or practical, and when an alternate process would pose similar or more serious toxicologic problems.

The control measures outlined below should help to minimize any possible risks to hospital personnel in the use of EO. These guidelines were developed by the American Society of Hospitals Central Service Personnel of the American Hospital Association, in cooperation with the Health Industry Manufacturers Association.

EDUCATION AND TRAINING

All EO sterilization procedures should be supervised by the central service manager or supervisor, or by the manager of any other department where such equipment is installed and operating.

All personnel working with EO should be given a complete orientation to EO processes, covering not only the proper use of the sterilization equipment but also the safety factors and hazards involved in use of the equipment and the chemical. In addition, an in-service training program on the EO sterilization process should be conducted and an attendance record kept for each employee.

Because proper functioning of the EO sterilizer and aerator is necessary for personnel safety, the equipment should have regular preventive maintenance, supervised by a competently trained individual. (Some manufacturers have such programs available.) Records should be kept on all gas sterilizer malfunctions and repairs.

INSTALLATION OF EO STERILIZERS

In order to prevent access to the equipment by unauthorized persons, EO sterilizers and aerators should be located in a restricted area. They should be installed

in a room that has 6 to 10 air changes per hour and complies with the local building codes. The air should be exhausted to the outside, well away from any intake ducts. There should be easy access to inspection and maintenance components, which should be located in well-ventilated areas, and the manufacturer's installation instructions should be strictly adhered to.

No other equipment should be stored in the room that accommodates the sterilizer and aerator equipment.

All tanks of EO should be stored in a special area that meets appropriate building codes and gas manufacturers' temperature specifications. Tanks should not stand free, but should be chained to a solid structure.

PERSONNEL PROTECTION

Personnel working with the EO sterilizer should wear protective gloves when handling items taken directly from it.

When the EO sterilization cycle has been completed, the door should remain open approximately 6 inches, and items should not be removed for 15 minutes.

Obviously, all items that have been EO sterilized and aerated should be handled as little as possible, and prolonged breathing of vapors should be avoided.

Accidental, excessive exposure to EO by inhalation or skin contact should be reported as an incident to the commanding officer of the naval hospital.

Hospitals should monitor the environment in rooms containing EO sterilizers and aerators. Monitoring equipment is expensive; however, it is important that the atmosphere in which people work be evaluated to prevent excessive exposure to EO.

SUMMARY

Following these guidelines in the handling of ethylene oxide should minimize the hazard to personnel working with EO sterilizers and aerators.

The national debate continues over possible federal curtailment of the use of ethylene oxide as a sterilant in hospitals. It is imperative that Navy hospitals demonstrate and document responsible hospital use of EO.

Scholars' Scuttlebutt

ACDUTRA at OIS Newport

Hundreds of students in the health professions will soon be receiving Active Duty for Training (ACDUTRA) orders to the Officer Indoctrination School (OIS), one of seven schools operated by the Naval Education and Training Center at Newport, Rhode Island.

The six-week ACDUTRA tour at OIS is primarily designed to prepare students for their roles as naval officers; however, instruction is also provided on the organization and mission of the Navy Medical Department and its officer corps—Medical, Dental, Nurse, and Medical Service.

The classroom curriculum at OIS consists of ten units of instruction. Units one through six are known as "core topics" and relate to general military and management skills. The remaining four units are called "track courses" and relate to subjects with direct application to a specific corps. Classes are usually scheduled between 0800 and 1600, Monday through Friday, with an hour allotted for lunch.

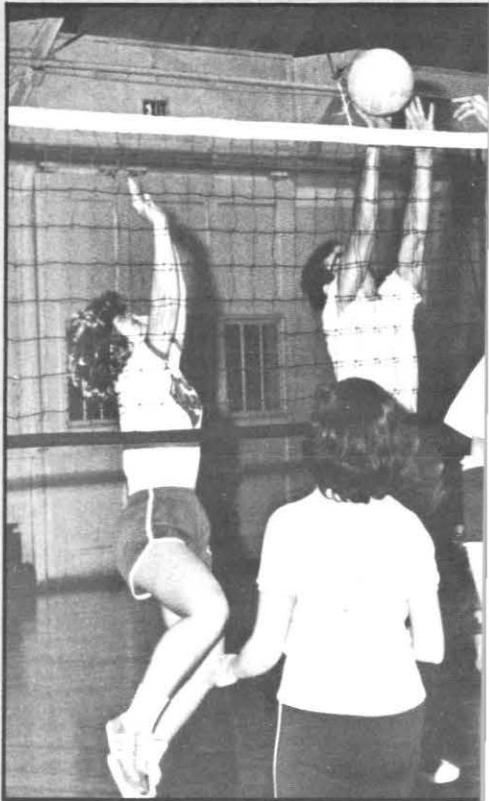
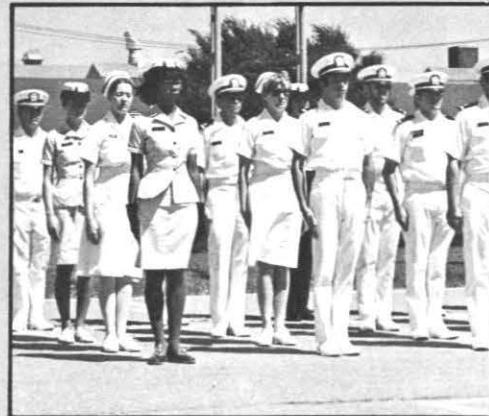
Students live in King Hall and share rooms similar to those in college dormitories. Three reasonably priced meals a day are served at nearby Ney Hall, and there are, in addition, the Commissioned Officers' Club, the Recreation Center cafeteria, and the "deli" at the convenience store. Also, many fast-food facilities and some fine restaurants are available in the community of Newport.

Recreational facilities for students at OIS include tennis, racket ball, volley ball, bowling, sailing, swimming pools, a movie theater, and a library. The officers' lounge at King Hall has color television.

The officer indoctrination course schedule permits off-station free time (liberty), provided students have kept up with their academic workload. Overnight liberty is authorized on Friday and Saturday nights, but not all weekends are free.

Newport itself is a beautiful old city, located on Narragansett Bay and the Atlantic Ocean. It has fine beaches, scenic drives, historic buildings, and excellent shopping and dining. Students are encouraged not only to visit Newport, but to see historic New England as well.

Each student scheduled to report to OIS Newport is provided detailed information, prepared by the Naval Health Education and Training Command, on curriculum, facilities, civilian clothing, uniforms, finances, transportation, and instructions for reporting.



OIS Newport (clockwise from top left): Students learn techniques of military drill; after-class study in King Hall; nurses break for lunch at Ney Hall; OIS staff member (third from right) gives pointers on sailing; students challenge staff in traditional volley ball game before graduation; Naval Education and Training Center campus



Okay, 'Doc', take a deep breath . . .

NOTAP Corpsman Rating Study Under Way

HMMC Fred A. Burkhart, USN

The tables have turned. Hospital corpsmen, long accustomed to asking their patients what ails them, are now themselves under scrutiny.

It's all happening under NOTAP—the Navy Occupational Task Analysis Program—which has begun a detailed study of the hospital corpsman rating. The current study is part of a BUPERS project to conduct a standardized task analysis of *all* Navy enlisted ratings and establish an occupational data bank.

In its participation in NOTAP, the Bureau of Medicine and Surgery sees an additional benefit beyond accomplishment of the program's objectives. Very simply, NOTAP is giving the Navy Medical Department a golden opportunity to take a long, hard look at the way the Hospital Corps functions.

In the past, the corpsman's role has too often been vaguely described in terms that paraphrase Gertrude Stein: A hospital corpsman is a hospital corpsman is a hospital corpsman. But recently it has been suggested that corpsmen should serve only in billets written to their technical specialties, at skill levels commensurate with their pay grades and formal training.

In fact, the Hospital Corps is a community of approximately 23,000 men and women who provide the technical and administrative support necessary for delivery of health care to the Navy and Marine Corps. Many hospital corpsmen's skills require special training. And because many of these technical skills are dissimilar—sharing commonality only in providing health care—a common training base is hard to establish.

Meanwhile, advances in technology, increasing specialization, continuing need to provide support to the operating forces, and other real-world situations complicate man-

agement and utilization of the Hospital Corps.

NOTAP is an effort to find out where the problems really lie and come up with practical solutions. NOTAP analysts are part of the Navy Occupational Development and Analysis Center, which has a staff of about 80 military and civilian employees skilled in collecting and analyzing occupational data.

Methods. Basically, NOTAP's study of the hospital corpsman rating has three phases:

- observing and interviewing corpsmen, to collect data that can be written into task statements and developed into questionnaires;
- administering task-statement questionnaires to selected corpsmen and programming their responses into usable data for task analysis;
- conducting task analysis.

Normally, NOTAP uses a single task-statement questionnaire to col-

lect occupational data for each Navy enlisted rating under analysis. But it was apparent from the beginning that a single questionnaire for hospital corpsmen would not serve the needs of the Navy Medical Department. Therefore, BUMED requested that each technical specialty be reviewed.

Unable to satisfy that request in a single effort, NOTAP personnel cooperated to the extent of their ability and selected the following specialties (with their Navy enlisted codes) for initial study: Afloat/Independent Duty (0000, 8402, 8407, 8425); Field Medical Service (8404); Biomedical Equipment Repair (8477, 8478, 8479); Radiology (8452); Preventive Medicine (8432); Ward Corpsmen (0000); Pharmacy (8482); Laboratory (8501-8507); Aerospace (8406, 8409); Optician (8463); Ocular and Otolaryngology (8444, 8445, 8446); Operating Room



With the help of corpsmen like this one, NOTAP will supply important data on the changing roles of Hospital Corps personnel. (Photo by PH2 Claudie Bob Johnson II)

(8483); Cardiopulmonary (8408).

During Phase 1, NOTAP analysts visited and interviewed hospital corpsmen at 39 different commands. The success of this initial phase is attributable to these men and women, who enthusiastically cooperated in the project by giving NOTAP personnel the benefit of their knowledge and experience.

Phase 2 of NOTAP is now under way. In late 1977, NOTAP personnel made trips to Norfolk, New London, San Diego, and Charleston to survey 342 corpsmen serving on ships and submarines. This year thousands of additional corpsmen serving in the billets selected for study will be asked to respond to the task-statement questionnaire.

During April and early May, NOTAP personnel will be administering questionnaires at Great Lakes, Ill.; Camp Lejeune, N.C.; Jacksonville, Fla.; Oakland and San Diego, Calif.; and Charleston, S.C.

Data collection under Phase 2 will continue through this summer, or until sufficient data has been gathered to permit task analysis. Phase 3, the task analysis itself, may begin as early as this spring for some specialties, and will continue through 1978.

Impressions. What NOTAP will finally reveal cannot, of course, yet be known; however, impressions gained from Phase 1 indicate that the roles and responsibilities of hospital corpsmen are changing and sometimes unclear. But this should not be surprising. As methods of providing health care change, those who deliver that care must adapt and follow the trends.

U.S. Navy Medicine will continue to report on the progress of this important project. Meanwhile, questions or comments on NOTAP may be addressed to HMCM Fred A. Burkhardt, HM1 David B. Crockett, or HM1 Louis C. Gerecz (assigned to the project as technical advisors) at the Bureau of Medicine and Surgery (Code 34), Washington, D.C. 20372; telephone: Autovon 294-4682 or 288-4626; Commercial (202) 254-4682 or 433-4626.

Letters

COVER DISLIKED

I think the December 1977 cover is objectionable and in very poor taste with bad connotations. It seems to me that in our society with its many drug problems of today, you could have made a better choice for *U.S. Navy Medicine*.

CAPT W.L. Skinner, MC, USN
Chief of Surgery
NRMC Charleston, S.C.

We're sorry you disliked the December cover, which was selected to highlight the article in that issue on BUMED's participation in the National Immunization Initiative.—Ed.

INFANT IMMUNIZATIONS

While reading the December 1977 issue, I noticed in the article "BUMED Backs Immunization Initiative" that you published a picture of a nurse administering an injection to an infant in the gluteal region.

I am absolutely amazed that this practice exists—apparently in a military organization—and that it was published in a medical publication. Injections should not be administered to infants in the gluteal region due to the greater possibility of hitting the sciatic nerve and causing paralysis. Every nursing school that I know of teaches its students that the more appropriate and safer place for injections in infants is into the muscles of the leg. I would hope that closer evaluation and supervision is given to those responsible for the administration of medications to infants.

LT K.J. Ivancic, NC, USNR
Charge Nurse, Pediatric Ward
NNMC Bethesda, Md.

In their product inserts, Wyeth Laboratories suggest all doses of DPT be injected intramuscularly, "preferably into the mid-lateral muscles of the thigh or deltoid."

Ross Laboratories' series of Nursing Inservice Aids also favors

the midanterior muscle of the thigh as the prime site of IM injection.

The fourth edition of Dorothy R. Marlow's *Textbook of Pediatric Nursing* recommends the vastus lateralis as the primary site of injection for infants "because it is well-developed at birth and because it is not close to major nerves and vessels."

The sixteenth edition of *Pediatrics*, edited by Abraham M. Rudolph, states: "The large muscle mass of the lateral thigh is the preferred site, but the deltoid is suitable in older children. Some physicians continue to administer these in the buttock in spite of the known risk of damage to the sciatic nerve."

We have always followed these recommendations and give all infant IM injections in the midanterior muscle of the thigh. We feel clarification of this error should appear in your publication to avoid future confusion.

HM2 P.E. Nast, USN
Senior Corpsman
Pediatric and Immunization Clinic
NRMC Camp Pendleton, Calif.

LT Ivancic and HM2 Nast are absolutely right. The photograph they refer to was not a Navy picture, but was graciously provided by the Center for Disease Control. The editors should, however, have looked at it more carefully.—Ed.

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Education & Training

AFRRI/NNMC

Nuclear Weapons Effects Course

CDR Richard F. Kiepfer, MC, USN

LTC John T. Mason III, USA

LT COL Lawrence F. Winans, USAF

With the proliferation of nuclear material throughout the world, there is an ever-increasing possibility that ionizing radiation injuries may occur.

Moreover, although the SALT negotiations may eventually reduce or even eliminate the possibility of a nuclear war, until that time the threat of the "mushroom cloud" is ever present. Because of this, and because nuclear material is used throughout the Armed Forces, military medical personnel must be prepared to treat radiation casualties in both peacetime and wartime situations. Although the condition of the casualty may be the same in either case, the circumstances surrounding his exposure will have great impact on his medical treatment.

Peacetime. Peacetime exposure to ionizing radiation, other than diagnostic and therapeutic, may come from a variety of sources. Generally, it will be accidental, but there is also a possibility that it may occur through the intentional acts of terrorists. In either case, a military medical facility will be treating casualties under peacetime conditions (i.e., the facility will be fixed and relatively well staffed), with no major restrictions on national communications and logistic capabilities.

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LTC Mason is Education Program Coordinator, and LT COL Winans is Chief of the Nuclear Sciences Department, Armed Forces Radiobiology Research Institute, Bethesda, Md. 20014.

Accidental exposures may occur as a result of nuclear reactor problems, mishandling of radionuclides, difficulties arising during transportation of radioactive material, or similar mishaps. Generally, such exposures would result in injuries of varying degrees to only a few people in a localized area. The probability that several accidental exposures would occur within a short time is remote; therefore, it is sufficient to prepare for isolated events.

Exposures resulting from acts of terrorists will come only from individuals who are so involved in some cause that the value of human life is insignificant to them. Fortunately, these individuals appear to be few. This paucity—and the safety and security procedures instituted for handling radioactive material—make this intentional exposure a remote possibility. Thus one again arrives at preparation for isolated events.

Since these intentional exposures, if they occur in peacetime, must be treated as accidents, the entire peacetime approach is oriented toward preparing for accidental exposures. The civilian medical community has been planning for such contingencies, especially where radiation sources are geographically concentrated. The Radiation Emergency Assistance Center/Training Site (REAC/TS), at Oak Ridge, Tenn., is a national center for the study of human radiation exposure. This agency can treat radiation accident cases. It also conducts national training courses in

handling such cases and acts as the U.S. national repository of information on radiation accidents.

Wartime. Wartime exposure to ionizing radiation would probably result from intentional nuclear weapon detonation. There might be cases of accidental exposure, but a military medical facility required to treat the accident casualties would be operating under wartime conditions, i.e., it would be semimobile, relatively understaffed, and restricted as to communications and logistic capabilities. Under these conditions, accidental cases would be treated in the same manner as intentional exposures.

In a nuclear war, both accidental and intentional exposures would be of more concern to the military than to the civilian doctor, since most such exposures would occur (it is to be hoped) in the war zone. Of course, if the conflict were to take place in the United States, the civilian medical community would also be affected and would be forced to function in somewhat the same way as the military.

The training problem. In the three services, training exists for military medical professionals on the overall effects of nuclear weapons and the political doctrines that may lead to their use. These professionals also receive instruction in treating trauma and mass casualties. But there has been no extensive course for military doctors on the detailed radiobiological effects of radiation, associating these effects with the overall conditions ex-

pected in a nuclear war (or other combined stress-and-injury situation).

This detailed instruction is necessary if the physician is to do more than simply treat the symptoms of a patient exposed to radiation. Moreover, continuing instruction for the military medical corps is required, since constant turnover leads to loss of the expertise of trained personnel.

Recognizing these needs, in 1976 the Surgeons General of the Army, Navy and Air Force asked the Armed Forces Radiobiology Research Institute (AFRRI), Bethesda, Md., to assist in developing a program to increase knowledge of nuclear weapons effects at all levels throughout the medical service. (The Surgeons General and the Director, Defense Nuclear Agency, comprise the Board of Governors for AFRRI.)

Course development. In *Phase I* (Fiscal Year 1977), the first step was to determine what should be taught in the new program and who the students should be. A short curriculum was prepared, covering the essentials of nuclear weapons and their effects. The initial course was limited to eight lecture periods, prepared and presented entirely by AFRRI personnel. A notebook containing material covered in the lectures was prepared for the students.

After this short course had been presented to the AFRRI staff, it was determined that the primary audience should be medical personnel having some familiarity with radiation. In the event of nuclear war, radiologists and nuclear medicine specialists probably would be called, because of their expertise, to advise on radiation injury. Of course, the skills of the entire medical community would be needed, and the radiation specialists would have to share their knowledge of nuclear weapon effects with the general internists and surgeons (who have less background in basic nuclear physics). Therefore, the selected primary audience for the new Nuclear Weapons Effects

Course was to be nuclear medicine students.

The only military short course in nuclear medicine is conducted twice annually at the National Naval Medical Center (NNMC) in Bethesda, Md. It lasts approximately two months. The new AFRRI course on nuclear weapons effects was injected into NNMC's Nuclear Medicine Course, primarily as part of the radiobiology instruction.

Condensed portions of the nuclear weapons effects lectures were also given to students from the Uniformed Services University of the Health Sciences (USUHS), cadets of the United States Army Military Academy, and medical resident physicians from Walter Reed Army Institute of Research and NNMC.

Another avenue of instruction was opened by development of TV tapes for the skeletal lectures of the course.

In *Phase II* (Fiscal Year 1978), the Nuclear Weapons Effects Course was expanded to 14 lecture periods, including more material on the biological effects of nuclear weapons and a period on the threat posed to the United States. For students in the NNMC Nuclear Medicine Course and USUHS, modifications were made in content and level of presentation. Agencies outside AFRRI were asked to assist, and they contributed significantly to the program.

In preparation for *Phase III* (Fiscal Year 1979), the Nuclear Weapons Effects Course is again being expanded, and with this expansion it will constitute one week of instruction as part of NNMC's Nuclear Medicine Course. (The lecture series developed during Phase II will continue to be presented to USUHS students.) Extensive outside support has been requested for new lectures not within AFRRI's area of expertise, and funding support and AMA credits have been obtained. Developments after FY 1979 will depend on acceptance of Phase III and feedback from those in the field.

As now envisioned, the course

will consist of 34 lecture periods of 50 minutes each, on the topics listed in the table accompanying this article. Instructing agencies, in addition to AFRRI, are: U.S. Army Nuclear and Chemical Agency (USANCA), Ft. Belvoir, Va.; Uniformed Services University of the Health Sciences (USUHS), Bethesda, Md.; U.S. Army Academy of Health Sciences (USAHS), Ft. Sam Houston, Tex.; Walter Reed Army Institute of Research (WRAIR), Washington, D.C.; U.S. Army Ordnance and Chemical Center and School (USAOCSS), Aberdeen Proving Ground, Md.; and Radiation Emergency Action Center/Training Site (REAC/TS), Oak Ridge, Tenn.

The course is being planned for October 1978 and again for January 1979. It will be conducted at AFRRI, on the grounds of NNMC.

Students in the AFRRI/NNMC course must be either active-duty M.D.'s, specializing in nuclear medicine or radiology, or persons with a graduate degree in a related field. They must have a "secret" security clearance.

AFRRI will provide funding for travel and one week's per diem allowance to 60 students—10 Army, 10 Navy, and 10 Air Force students in each of the two classes. Unfunded additional students may be accepted from each service for each class, on a first-come-first-served basis.

The course is accepted by the American Medical Association for Category I Hour for Hour Continuing Education Credit.

Application. Prospective students may apply through normal training channels. Information may be obtained from CDR Richard F. Kiepfer, MC, USN, Head, Nuclear Medicine Branch, National Naval Medical Center, Bethesda, Md. 20014 (Autovon 295-0208; Commercial 202-295-0208); or LTC John T. Mason III, USA, Education Program Coordinator, Armed Forces Radiobiology Research Institute, Bethesda, Md. 20014 (Autovon 295-0227; Commercial 202-295-0227).

AFRRI/NNMC NUCLEAR WEAPONS EFFECTS COURSE, FY 1979

<u>SUBJECT</u>	<u>LECTURE PERIODS*</u>	<u>INSTRUCTING AGENCY</u>
<u>Introduction:</u>		
Introduction; History of Nuclear Weapons	1	AFRRI
Warsaw Pact Nuclear Concepts (SECRET)	1	USANCA
Tactical Commanders Concept of Nuclear War	1	USANCA
Nuclear Weapon Phenomenology	2	AFRRI
<u>Biomedical Effects:</u>		
Blast and Thermal Effects of Nuclear Weapons	1	AFRRI
Radiation Biology	4	AFRRI
Early Cardiovascular Decrement of Personnel in Nuclear Weapon Environments	1	AFRRI
Early Behavioral Performance Decrement of Personnel in Nuclear Weapon Environments	1	AFRRI
Psychological Effects of Nuclear Operations	1	USUHS
Low Radiation Dose Effects	1	USAAGHS
Combined Radiation Injury with Chemicals	1	AFRRI
Non-Ionizing Radiation Effects	1	AFRRI
<u>Impact on Medical Service:</u>		
Medical Operations in a Nuclear War	1	USAAGHS
Estimation of Casualties	1	USAAGHS
Patient Management Techniques	1	USAAGHS
Diagnosis and Treatment of Nuclear Weapon Casualties . .	1	WRAIR
<u>Detection and Protection:</u>		
Radiation Instruments	1	AFRRI
NBC Warning and Reporting	1	USAOCCTS
NBC Predictions	1	USAOCCTS
Operations in Fallout	1	USAOCCTS
<u>Miscellaneous:</u>		
Nuclear Reactors	1	AFRRI
Nuclear Material Accidents	1	REAC/TS
Research Problems	1	AFRRI
Nuclear Exercise	7	USAAGHS

* 50 minutes each

A Report of Intractable Epistaxis

CDR Alan D. Kornblut, MC, USNR

CDR Raymond A. Kempf, MC, USN

LCDR Frank S. Curto, Jr., MC, USN

Epistaxis, or nosebleed, is a relatively common medical problem that can result from a wide variety of causes. Most nosebleeds are due to trauma (which may be self-inflicted from "picking"), or they may occur spontaneously if the nasal mucosa dries and cracks, with subsequent bleeding. This latter cause is particularly significant in hypertensive patients or in patients with a deformed nasal septum. Occasionally, however, nosebleeds may be associated with neoplastic growths or with use of medications which have anticoagulant properties.

Usually, nosebleeds can be controlled by relatively simple supportive measures, such as reassurance, rest, and judicious placement of intranasal cotton pledgets for hemostasis. When these measures fail, more aggressive therapy becomes necessary. Treatment may include firm anterior or posterior nasal packing, prophylactic antibiotics to prevent secondary paranasal sinus infection, and sedatives or tranquilizers to control any apprehension experienced by the patient (1-3). Uncommonly, transfusions (particularly with fresh frozen plasma or fresh blood), supplemental medications (such as phytonadione and epsilon-aminocaproic acid) to effect coagulation, and even selective surgical ligation of vessels to the nose may be required to prevent exsanguination (4-6). These measures are described in the following report, which typifies management of the complicated patient with nasal bleeding and describes some of the many problems that may be encountered in effecting control.

PATIENT REPORT

The patient was a 46-year-old white housewife, the dependent wife of a retired Marine Corps chief warrant officer.

On 13 April 1977 she was transferred from Naval Regional Medical Center, Camp Lejeune, N.C., to the National Naval Medical Center, Bethesda, Md., for care of intractable epistaxis.

The patient had undergone mitral commissurotomy in 1956 as treatment for mitral stenosis which had followed rheumatic heart disease in childhood. She did well until 1971 when mitral valve replacement became necessary. This procedure was complicated by atrial fibrillation with a slow ventricular response. A permanent transvenous cardiac pacemaker was placed; digitalization was also required and maintained.

In March 1977, cardiac surgery again became necessary and a tricuspid porcine valve was inserted at the National Naval Medical Center. Following surgery, anticoagulation with coumadin was begun. The patient was then discharged from hospital care and did well at home until the first week of April 1977, when she began to experience recurrent nosebleeds.

Coumadin was stopped, and anterior nasal packing was placed. When bleeding persisted, she was admitted to NRMC Camp Lejeune, where the nasal packs were immediately readjusted and fresh frozen plasma was given with parenteral phytonadione (vitamin K₁). When bleeding continued, whole blood transfusion became necessary.

It was then believed that better control of bleeding could be realized with selective transantral ligation of the left internal maxillary artery. This surgery was performed on 11 April, without complications. A Foley catheter was placed in the left maxillary antrum for wound hemostasis, and nasal packing was maintained. However, when bleeding continued, the patient was transferred to the National Naval Medical Center for further care. At the time of her transfer she had received approximately 13 units of transfused blood.

Drs. Kornblut and Curto are with the Department of Otolaryngology, and Dr. Kempf is with the Department of Hematology, National Naval Medical Center, Bethesda, Md. 20014.

Physical examination on admission to NNMC showed the patient to be markedly apprehensive and in acute distress. Although the left antral catheter and nasal packs were still in place, bloody discharge oozing from the nose and throat required constant suction. The patient was receiving blood transfusion at the time of admission, but her vital signs had remained stable (pulse rate 75 beats per minute; blood pressure 158/90). Prominent left infraorbital, maxillary and buccal edema and ecchymosis, with soft tissue hematoma, were present and were compatible with recent surgery on the left maxilla. Multiple integumental petechiae were found over the back and arms, and a soft tissue hematoma was uncovered over the medial aspect of the left ankle. In addition, the patient had right thoracotomy and median sternotomy scars, as well as a left upper abdominal scar consistent with venous pacemaker implantation. Auscultation of the heart revealed a regular sinus rhythm, but with a low-pitched ejection murmur that was best heard at the cardiac apex and that radiated to the left sternal border. Hepatomegaly was also found on palpation of the abdomen.

Admission laboratory studies showed a hemoglobin level of 11 gm/100 ml and a hematocrit level of 32.2%. Serum electrolytes, blood urea nitrogen, and creatinine levels were within normal limits. However, total bilirubin level (2.7 mg/100 ml) was elevated, as were serum alkaline phosphatase (90 mU/ml) and lactic dehydrogenase (291 mU/ml) levels. Total serum protein level was 6.2 gm/100 ml, with 2.5 gm/100 ml albumin. Platelet count, prothrombin time, and partial thromboplastin time were within normal limits.

In view of the persistent bleeding from the nose and throat, it was felt that angiography on admission might help define the patient's site of bleeding and facilitate further care (7). The procedure, completed with some difficulty, demonstrated that primary bleeding was from the posterior oropharynx through an anomalous ascending pharyngeal artery that originated from the right external facial artery (Figures 1 and 2). Consideration was given to possible gelfoam embolization, but since the patient had by then received almost 20 units of blood, further delay in definitive therapy was thought to be unsafe.

Consequently, emergency ligation of the right external carotid artery was performed under local anesthesia. The procedure included selective ligation of both the external facial and ascending pharyngeal arteries. Bleeding was immediately controlled, but nasal and antral packs were left in place to minimize further mucosal trauma.

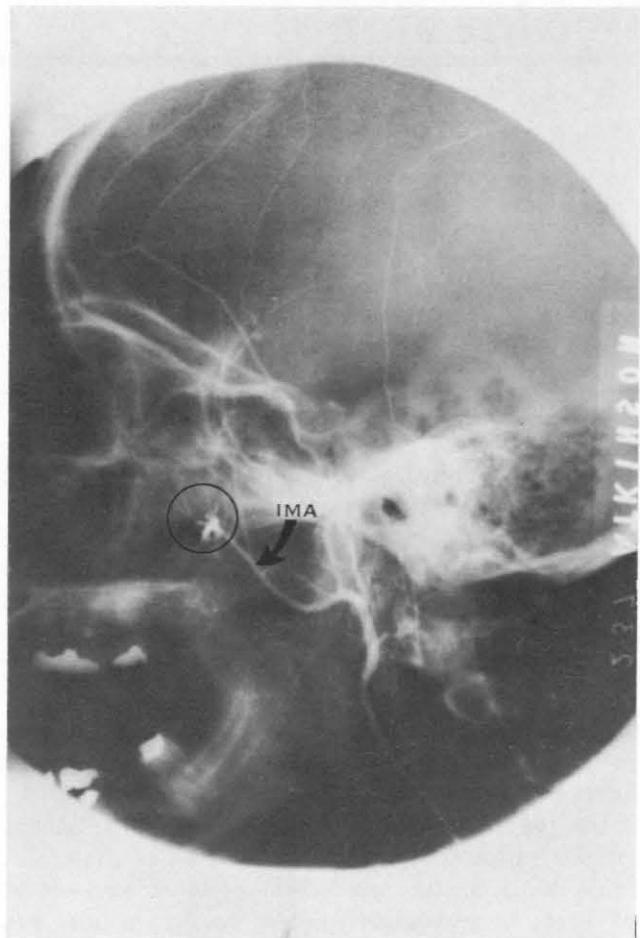


FIGURE 1. Left external carotid angiogram. Surgical clips occluding the internal maxillary artery (IMA) are circled

The patient's subsequent hospital course was stormy. Following surgery the patient had fever spikes of 103° F, which were related to pneumonitis from aspiration of blood as well as to possible sinusitis as a consequence of nasal packing. Cephalexin was given initially, in addition to pulmonary physiotherapy. After consultation with the Thoracic Surgery and the Infectious Disease Services, gentamycin and oxacillin were also given, with resolution of fever.

Nasal and antral packs were removed safely within five days of surgery. However, other problems occurred. On 16 April, an S3 cardiac murmur was detected, and subsequent chest roentgenograms were believed to be compatible with early congestive heart failure. Digitalization with digoxin was maintained, but parenteral furosemide (40 mg/daily) was added for diuresis and control.

A sterile wound hematoma subsequently developed in the right side of the patient's neck, but

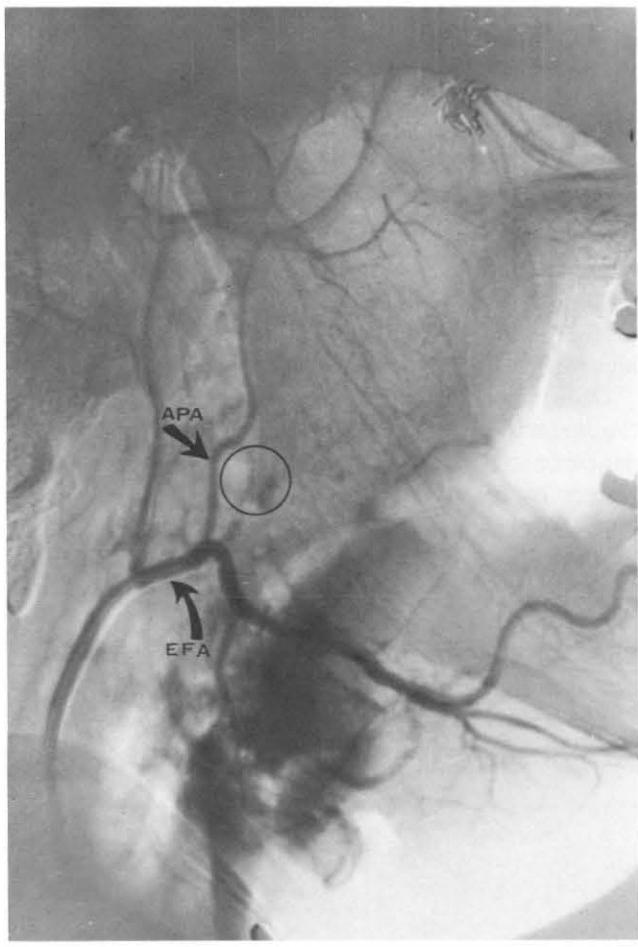


FIGURE 2. Right carotid angiogram. Bleeding site in the pharynx (circled) originates from collateral vessels derived from the ascending pharyngeal (APA) and external facial arteries (EFA).

cleared spontaneously. Although admission clotting studies had been normal, repeat studies on 18 April uncovered a markedly elevated partial thromboplastin time (52.2 seconds vs. a control of 29.7 seconds). Fibrinogen level was 420 gm/100 ml. Platelet counts and prothrombin time were both normal.

Integumental petechiae were again noted, with increased capillary fragility. A consultation was then obtained with the NNMC Hematology Service. Factor analysis and repeat coagulation studies were performed, and a clotting pattern was uncovered that was compatible with localized fibrinolysis. It was then suspected that the hematoma that had persisted in the left maxillary soft tissues was releasing fibrin split products into the blood, causing abnormal partial thromboplastin and thrombin times. The hematoma was therefore evacuated and a Foley catheter used to control wound bleeding.

Because of the high-output cardiac failure and sepsis the patient had experienced during her hospitalization, it was feared that the prosthetic cardiac valves might be compromised. Retrograde cardiac catheterization was performed on 9 May through a left antecubital vein. No significant flow gradients were found, which indicated that the prostheses were functioning normally. After this procedure, however, an antecubital hematoma developed and a spontaneous right inguinal hematoma was also uncovered. Both hematomas were evacuated without complication.

Further clotting studies revealed that an uncharacterized antithrombin factor had developed, with a positive indirect Coombs (anti-Kell) test. A persistent hypergammaglobulinemia (4.6-4.8 mg/100 ml) was also noted, which was believed to represent a reactive pattern alone.

The rest of the patient's hospital course was supportive and without additional incident. Outpatient care began on 26 May. Discharge medications included digoxin and diazepam (as a tranquilizer), as well as iron and vitamin supplements. The patient has done well since her discharge, although moderate elevation of the partial thromboplastin time persists.

SUMMARY

This report of intractable epistaxis describes some of the difficulties encountered in the clinical management of this problem, and outlines procedures that might be needed to achieve satisfactory control. Although many measures have been employed to treat problem patients with nasal bleeding, the basis for effective therapy still remains careful, systematic evaluation.

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Survey of Tarsal Coalitions Found at MCRD Parris Island, S.C.

LT John J. Malone, MSC, USN

Tarsal coalitions have been observed for more than 200 years. In 1879, Anderson (1), an anatomist from Ireland, described bilateral talonavicular coalition, although the significance of this deformity was not known. In 1921, Slomann (2) associated coalitions with "peroneal spastic flatfoot." But it was not until 1948 that Harris and Beath (3) recognized that the rigid valgus foot was not due to peroneal spasm, but to congenital fusion.

The clinical significance of tarsal coalitions is that they are associated with symptomatic flatfeet. The condition is a congenital anomaly affecting the foot and is inherited by means of an autosomal dominant trait. The etiology is a matter of conjecture, but some theories have advanced, e.g., congenital failure of primitive mesenchyme, trauma, and infection.

The term "coalition" denotes a fusion or an ankylosis of a joint, prohibiting normal biomechanical motion and thus producing a rigid flatfoot. The rigidity is the factor that distinguishes this deformity from the more prevalent, flexible pes planus.

Coalitions, which are referred to in literature as "bars" or "bridges," may be classified into three types, depending on the histological union: (1) osseous (synostosis), (2) cartilaginous (synchondrosis), and (3) fibrous (syndesmosis). All three produce the same type of rigid foot deformity. Anatomically, they may manifest themselves in any of the seven tarsal bones, but they are most commonly found at the talocalcaneal or calcaneonavicular joints.

CLINICAL FINDINGS

The pathognomonic sign of a coalition is the diminution or absence of inversion-eversion motion at the subtalar (talocalcaneal) joint or the Choparts joint (between the talocalcaneal and the lesser tarsus).

On clinical examination, it must be established whether the frontal plane motion is originating from the intrinsic joints of the foot or from the joint created by the ankle mortise and the talus. To accurately examine the range of motion of the subtalar

joint, the foot should be placed in a neutral position and slightly dorsiflexed. This prevents frontal plane motion at the ankle joint by locking the wide trochlear surface of the talus in the ankle mortise.

Often there is a diffuse, nonpitting edema and tenderness on the dorsum of the foot. The pain is exacerbated by passive inversion of the foot, and is caused by compensatory strain on other joints of the foot. Although the peroneal muscles will look as though they are in spasm, in most cases this is not spasm, but a tautness that represents a physiological shortening as a result of the valgus deformity. Therefore, the term "peroneal spastic flatfoot" is a misnomer and is not to be associated with coalitions.

The patient usually has a marked, abducted, duck-like gait, almost as if he were walking on the insides



"Normal" foot. Note joint space between talus and os calcis



Obliteration of joint space between talus and os calcis. Note prominent osteophyte at head of talus

LT Malone is a podiatrist in the Department of Orthopedics, Branch Dispensary, Naval Hospital Beaufort, MCRD Parris Island, S.C. 29905.

of his ankles. His toe-off will be apropulsive, since he lacks the ability to supinate his foot at this critical point of walking. When the patient is examined in a full weight-bearing stance, the heel will be in valgus position and will fail to reduce in a non-weight-bearing stance.

Tarsal coalitions are not exclusive of sex or age, but are found primarily in males in the second decade of life, and may be bilateral. Patients with coalitions may or may not be symptomatic, depending on factors such as lifestyle and occupation. Often patients have asymptomatic coalitions until such factors as excessive use of their feet or trauma precipitate an episode of podalgia.

RADIOGRAPHIC FINDINGS

The subtleties of radiographic techniques can make identification of coalitions a challenging task, even for the seasoned clinician or radiologist. The position of the patient's foot and the angle of the tube may produce overlapping of bone, presenting a "pseudo-coalition" on the X-ray film.

In order to avoid a diagnostic error, several oblique views of the foot should be obtained. Besides the standard views, a coalition or an axial view is needed to rule out a fusion of the middle facet at the sustentaculum tali of the talocalcaneal joint. If radiographs are inconclusive, tomograms and arthrograms of the suspect joint may aid in the diagnosis.

On the lateral view of the foot, one sees an obliteration of the joint space between the talus and calcaneus, with dorsal lipping of the talus—in actuality, an osteophyte resulting from arthritic changes. There may also be a broadening of the posterior process of the talus. On examination of the medial oblique view, there will be no evidence of a joint between the anterior process of the calcaneus and the navicular. Instead, there will be an osseous bridge between the two bones.

Cartilaginous and fibrous coalitions are not as easily identified as osseous bars. The clinician must look for radiographic clues such as irregularities and obscure cortical margins. In these cases, there must be a careful correlation between radiographic and clinical findings.

TREATMENT

Treatment varies with the degree of symptomatology and whether the condition is acute or chronic. Usually there is some immediate abatement of pain with rest, contrast baths, and analgesics. Rigid

appliances or special footgear may be of palliative value. Intra-articular injections of insoluble corticosteroids may be useful in alleviating discomfort from cartilaginous and fibrous bars. In an acute episode, immobilization in a short leg walking cast may be the treatment of choice.

Surgical excision of a bar has no place in the treatment of painful coalitions because of the secondary arthritic changes that will have occurred in other joints of the foot. In recalcitrant cases an arthrodesis procedure may be in order, such as a triple arthrodesis or Grice procedure.

INCIDENCE OF PATHOLOGY

In 1948, Harris and Beath (3), performing routine physical examinations on 3,600 Canadian Army enlistees, found 72 patients with peroneal spastic flatfoot. In 1951, Vaughan and Segal (4), while in the U.S. Army, examined 2,000 patients with painful feet and found 21 with radiographic evidence of tarsal coalitions.



Example of osseous fusion between the calcaneus and the navicular (medial oblique view)



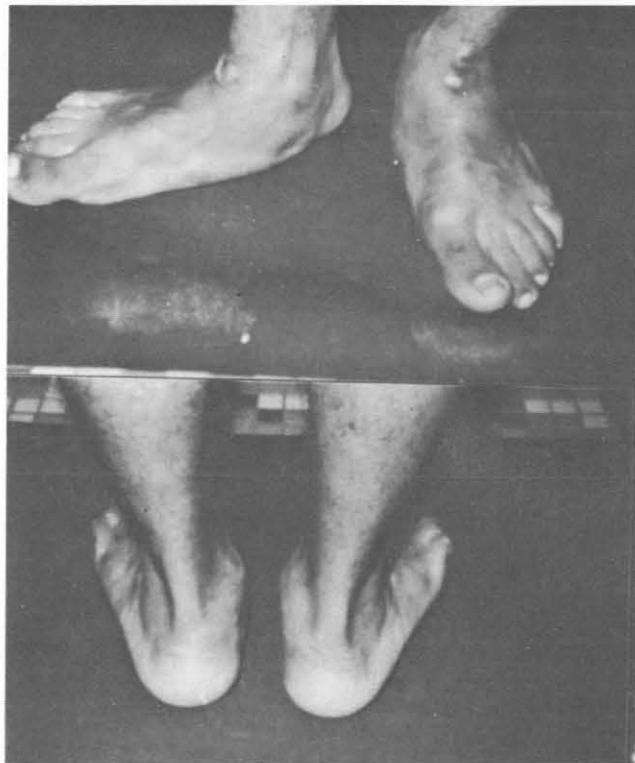
Markedly pronated foot with complete osseous fusion of subtalar joint and dorsal lipping at talonavicular joint

The Marine Recruit Depot at Parris Island, S.C., receives approximately 28,000 recruits a year. There are approximately 14,000 recruit visits to the Podiatry Clinic per year for various foot and ankle maladies. In a one-year period (June 1975 to June 1976), 68 recruits received medical discharges for symptomatic pes planus. Of that number, 11 showed radiographic evidence of tarsal coalitions (see table).

As is evident from the data collected, the calcaneonavicular synostosis was the most common coalition seen at our clinic. The age range of the recruits with this pathology was 17 to 22 years. The majority of these patients denied having any significant foot problems prior to entering the service and were active in high school athletics and sports. One patient's coalition had been previously diagnosed by a civilian doctor, who had surgically excised it.

None of the 11 patients could relate any clear history of traumata, activities, or events that might have precipitated their foot pain. In most cases the pathology appeared gradually and insidiously, except in one patient who developed pain in his feet after a long forced march.

Most patients responded satisfactorily to light duty and supportive therapy, consisting of crutches, strapping, analgesics, and hydrotherapy. Unfortunately, when these patients were sent back to full



Severe rigid valgus foot deformity—heel markedly everted

Tarsal Coalitions in Marine Recruits, One-Year Period

Coalitions	No. of Cases
Talocalcaneal (synostosis)	2
Calcaneonavicular (synostosis)	6
Calcaneonavicular (syndesmosis)	2*
Calcaneonavicular (synostosis)	1**

*Both cases were bilateral.

**Patient had bar surgically excised prior to his entrance into the service.

duty they became symptomatic and were later medically discharged from the service. One patient with a diagnosis of bilateral calcaneonavicular synostosis did not respond to the usual treatment regimen and had to be immobilized in short leg walking casts for a period of four weeks. After his four weeks of immobilization, he was relatively asymptomatic and was medically discharged.

CONCLUSION

In the examination of symptomatic flatfeet, one should be alert to clinical and radiographic findings. If there is exquisite pain on supination of the foot, and evidence of limitation of motion at the subtalar joint on the frontal plane, one should suspect a tarsal coalition. In addition to routine radiographs, several oblique views, as well as axial views, should be acquired to rule out a coalition at the sustentaculum tali.

Treatment varies, depending on the severity of the symptoms. In most cases, conservative measures will alleviate the condition. Surgical intervention, in the form of an arthrodesing procedure, may be the treatment of choice for recalcitrant cases.

It has been our experience that patients presenting with this deformity cannot tolerate the rigors of recruit training and should be discharged from the service as they are identified.

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3. Harris RI, Beath T: Etiology of peroneal spastic flat foot. *J Bone Joint Surg (Br)* 30B:624-634, 1948.
4. Vaughan WH, Segal G: Tarsal coalition with special reference to roentgenographic interpretation. *Radiology* 60:855-863, 1953.

BUMED SITREP

RESIGNATION REQUESTS . . . Navy policy for voluntary resignation of regular and Reserve officers serving on active duty requires the following statements in the command's endorsement:

- Comment on circumstances of all resignations, such comment to be made only after an interview has been held with the resigning officer.
- For regular officers, a statement as to whether appointment in the Naval Reserve is recommended.

When appropriate, an assessment should be provided of the need for a qualified relief, to include recommendation concerning whether a billet can be left vacant and the maximum acceptable duration of such a vacancy.

For more information, refer to SECNAV Instruction 1920.3H of 12 Aug 1975.

NEW DEVICES . . . The following physiology and water survival devices are in the design and procurement stage:

- Multi-station disorientation demonstrator.
- "Vertigon" type refresher training device for disorientation.
- Universal helicopter underwater egress trainer (9D5).
- Parachute drop and disentanglement trainer (9F6).

These devices will be placed at Naval Aviation Schools Command in Pensacola, Fla., at certain aviation physiology units, and at other water survival training agencies.

ANTARCTICA STUDIES . . . Sixty Navy members who wintered over in Antarctica during Operation Deep Freeze 1976 were among the subjects of a National Science Foundation research project that may end certain widespread beliefs about the relationship between prolonged isolation and immunity from respiratory diseases.

Recently released findings of scientists who studied Navy men at McMurdo Station and New Zealanders at Scott Station in Antarctica show that during prolonged isolation, resistance to disease did *not* decrease, contradicting previously accepted theory.

If confirmed by further research, these findings will significantly advance knowledge of how long periods of isolation affect human physiological proc-

esses. Study results may influence planning for programs which require long periods of isolation—further Arctic and Antarctic exploration and space travel, for example.

KUDOS . . . When asked recently for information about retention of USS *Ranger* crewmembers, the ship's commanding officer identified medical support from NRMC Bremerton as one very positive retention factor. Singled out for praise was the attitude of Bremerton medical personnel, as demonstrated by a genuine concern for *Ranger* crewmembers and their families.

ORGAN TRANSPLANTS . . . The Organ Transplant Service at the National Naval Medical Center has been transferred to Walter Reed Army Medical Center, Washington, D.C. Merging the two military transplant programs should help reduce costs, provide a better training program for physicians and medical students, and ensure the best possible patient care.

The agreement between the two medical centers calls for WRAMC to provide most direct patient care—to include preoperative dialysis and postoperative

followup. NNMC and the Naval Medical Research Institute will continue to provide the services of its tissue bank and oversee the work of technicians who determine tissue types of donated kidneys. Also, the Navy is responsible for preserving kidneys from the time they are obtained until they are transplanted.

Both Navy and Army physicians will be able to carry out transplantation research, including animal experimentation, at NMRI.

Fellowships and residency rotations are available in clinical and investigational areas of transplantation and organ preservation.

ASBESTOS PROTECTION . . . Respirators described as suitable for protection against dusts and mists alone do not protect against dusts and mists that contain asbestos. Only equipment identified in the National Institute of Occupational Safety and Health's list of approved respirators as specifically approved for use against asbestos-containing dusts and mists is acceptable. Check NIOSH publication No. 77-195: Cumulative Supplement of NIOSH Certified Equipment, June 1977.



NRDC SAN DIEGO . . . The Navy's largest, most modern dental facility was dedicated 18 Nov 1977 at San Diego. The 132,000 square foot complex comprises three buildings: a clinic with 100 dental operating rooms; a supply and dental equipment repair facility; and the School of Dental Assisting and Technology, the Navy's only school for training dental technicians. The new facility will serve fleet units in the San Diego area. It will also be headquarters for Naval Regional Dental Center San Diego.

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